

CLAIMS

1. A light condensing system comprising:

a backlight system having a light source and a first light

**5 condensing section (X) capable of condensing emitted light from
the light source within $\pm 60^\circ$ of the front direction; and**

**a light condensing film with no patterned structure as a
second light condensing element (Y).**

10 2. The light condensing system according to claim 1,

wherein

**the backlight system having the first light condensing
section (X) is a light source and a microprism sheet array disposed
on the light source.**

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3. The light condensing system according to claim 1,

wherein

**the backlight system having the first light condensing
section (X) is a mioprism formed light guide combined with a light
20 source.**

4. The light condensing system according to claim 1,

wherein

**the backlight system having the first light condensing
25 section (X) is a microdot formed light guide combined with a light**

source.

5. The light condensing system according to any of claims
1 to 4, wherein

5 **the light condensing film used as the second light**
condensing element (Y) has no patterned structure; therefore,
neither a moiré nor an interference fringe occurs between the light
condensing film and a regular pattern of another optical member
by applying the light condensing film to a liquid crystal cell when
10 **optical observation is conducted from the front side (a viewer side).**

6. The light condensing system according to any of claims
1 to 5, wherein

the light condensing film used as the second light
15 **condensing element (Y) is a polarization element (A) in a structure**
in which a retardation layer (b) is disposed between at least two
reflection polarizers (a) having respective polarized light selective
reflection wavelength bands superimposing on each other.

20 7. The light condensing system according to claim 6,
wherein

a reflection polarizer (a) is a circular polarization type
reflection polarizer (a1) transmitting circularly polarized light but
selectively reflecting a reverse circularly polarized light and
25 **a retardation layer (b) has a retardation layer (b1) having a**

front retardation (in the normal direction) of almost zero and a retardation of $\lambda/8$ or more relative to incident light incoming in a direction inclined from the normal direction by 30° or more.

5 8. The light condensing system according to claim 6,

wherein

the reflection polarizer (a) is a linear polarization type reflection polarizers (a2) transmitting one of linearly polarized lights perpendicular to each other, but selectively reflecting the other thereof,

the retardation layer (b) comprises a retardation layer (b1) having a front retardation (in the normal direction) of almost zero and a retardation of $\lambda/4$ or more relative to incident light incoming at a direction inclined from the normal direction by 30° or more,

15 layers (b2) each having a front retardation of about $\lambda/4$ disposed on both sides of the retardation layer (b1), one of the layers (b2) being disposed between the retardation layer (b1) and a corresponding linear polarization type reflection polarizer (a2) and the other of the layers (b2) being disposed between the retardation 20 layer (b1) and another linear polarization type reflection polarizer (a2),

the layer (b2) on the incidence side is arranged at an angle of 45° (-45°) $\pm 5^\circ$ relative to the polarization axis of the linear polarization type reflection polarizer (a2) on the incidence side,

25 the layer (b2) on the emission side is arranged at an angle of

- 45° (45°) ± 5° relative to the polarization axis of the linear polarization type reflection polarizer (a2) on the emission side, and the layer (b2) on the incidence side and the layer (b2) on the emission side are arranged at an arbitrary angle formed between 5 the respective slow axes thereof.

**9. The light condensing system according to claim 6,
wherein**

the reflection polarizers (a) is a linear polarization type 10 reflection polarizers (a2) each transmitting one of linearly polarized lights perpendicular to each other, but selectively reflecting the other thereof,

the retardation layer (b) comprises two biaxial retardation layers (b3) each having a front retardation of about $\lambda/4$ and an Nz 15 factor of 2 or more,

the slow axis direction of the layer (b3) on the incidence side is arranged at an angle of 45° (-45°) ±5° relative to the polarization axis of the linear polarization type reflection polarizer (a2) on the incidence side,

20 the slow axis direction of the layer (b3) on the emission side is arranged at an angle of -45° (+45°) ±5° relative to the polarization axis of the linear polarization type reflection polarizer (a2) on the emission side, and

25 the layer (b3) on the incidence side and the layer (b3) on the emission side are arranged at an arbitrary angle formed between

the respective slow axes thereof.

10. The light condensing system according to claim 6,

wherein

5 **the reflection polarizers (a) is a linear polarization type reflection polarizers (a2) each transmitting one of linearly polarized lights perpendicular to each other, but selectively reflecting the other thereof,**

10 **the retardation layer (b) comprises one biaxial retardation layer (b4) having a front retardation of about $\lambda/2$ and an Nz factor of 1.5 or more,**

15 **the slow axis direction of the layer on the incidence side is arranged at an angle of 45° (-45°) $\pm 5^\circ$ relative to the polarization axis of the linear polarization type reflection polarizer (a2) on the incidence side,**

the slow axis direction of the layer on the emission side is arranged at an angle of -45° (45°) $\pm 5^\circ$ relative to the polarization axis of the linear polarization type reflection polarizer (a2) on the emission side, and

20 **the polarization axes of the two linear polarization type reflection polarizers (a2) are almost perpendicular to each other.**

11. The light condensing system according to any of claims

1 to 5,

25 **wherein the light condensing film used as the second light**

condensing element (Y) is a band pass filter and the light source has a bright line spectrum.

12. The light condensing system according to claim 11,

5 **wherein**

the band pass filter is an evaporation-deposited multilayer film band pass filter.

13. The light condensing system according to claim 11,

10 **wherein**

the band pass filter is a cholesteric liquid crystal band pass filter.

14. The light condensing system according to claim 11,

15 **wherein**

the band pass filter is a band pass filter constituted of a stretched film from a base material extruded in multilayer laminate made of resin materials having respective different refractive indexes.

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15. The light condensing system according to claim 11,

wherein

the band pass filter is a band pass filter constituted of a thin multilayer precision coating film made of resin materials having respective different refractive indexes.

- 16. A transmission liquid crystal display comprising at least:**
- a light condensing system according to any of claims 1 to 15;**
- 5 a liquid crystal cell transmitting collimated lights; and**
- polarization plates disposed on both sides of the liquid crystal cell.**